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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------------|------------------------|
| 10/714,065 | 11/14/2003 | Tatsuya Sugawara | SIW-069 | 1411 |
| 959 7590 08/23/2007 LAHIVE & COCKFIELD, LLP ONE POST OFFICE SQUARE BOSTON, MA 02109-2127 | | | EXAMINER RUTHKOSKY, MARK | |
| | | | ART UNIT 1745 | PAPER NUMBER |
| | | | MAIL DATE 08/23/2007 | DELIVERY MODE PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/714,065

Applicant(s)

SUGAWARA ET AL.

Examiner

Mark Ruthkosky

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 5-8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kashiwagi (US 2002/0136942) in view of Kobayashi et al. (JP2002-33110A.)

The instant claims are to a fuel cell system comprising a fuel cell for generating power by being supplied with a fuel gas and an oxidizing gas; a fuel gas supply path for supplying a fuel gas to the fuel cell; a fuel off-gas circulation path for returning a fuel off-gas discharged from the fuel cell to the fuel gas supply path; an ejector, provided in the fuel gas supply path and driven by fluid flow energy, for supplying the fuel off-gas in the fuel off-gas circulation path flow to the fuel gas supply path; a fuel pump, provided in the fuel off-gas circulation path or on the fuel gas supply path and downstream with respect to the ejector, and driven by a rotating machine, for pressurizing the fuel off-gas; a discharge valve for discharging the fuel off-gas from the fuel off-gas circulation path; and a control device operatively connected to the fuel pump and to the discharge valve.

With regard to the controller, it is noted that while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. Cited in MPEP, In re Schreiber, 128

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F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997.) A claim containing a “recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus” if the prior art apparatus teaches all the structural limitations of the claim. Cited in MPEP, Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987.)

Kashiwagi (US 2002/0136942) teaches a fuel cell system comprising a fuel cell for generating power by being supplied with a fuel gas and an oxidizing gas; a fuel gas supply path for supplying a fuel gas to the fuel cell; a fuel off-gas circulation path for returning a fuel off-gas discharged from the fuel cell to the fuel gas supply path; an ejector, provided in the fuel gas supply path and driven by fluid flow energy, for supplying the fuel off-gas in the fuel off-gas circulation path flow to the fuel gas supply path; a fuel pump, provided in the fuel off-gas circulation path or on the fuel gas supply path and downstream with respect to the ejector, and driven by a rotating machine, for pressurizing the fuel off-gas (see figures 1-3 and 7, the corresponding text and the claims.) A control device is operatively connected to the fuel pump. The reference does not teach a discharge valve for discharging the fuel off-gas from the fuel off-gas circulation path or a control device operatively connected to the discharge valve. The reference teaches a discharge section for discharging gas to the atmosphere, however no valve is expressly cited. Further, the reference does not teach a voltage-measuring device.

Kobayashi et al. (The teachings of Kobayashi will be reference to the corresponding US patent 6,844,094, as it is printed in English), however, teaches a teaches a fuel cell system comprising a fuel cell for generating power by being supplied with a fuel gas and an oxidizing gas; a fuel gas supply path for supplying a fuel gas to the fuel cell; a fuel off-gas circulation path

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for returning a fuel off-gas discharged from the fuel cell to the fuel gas supply path; and an ejector, provided in the fuel gas supply path and driven by fluid flow energy, for supplying the fuel off-gas in the fuel off-gas circulation path flow to the fuel gas supply path (see figures 1-2, the claims and column 4.) The fuel cell system includes a discharge valve for discharging the fuel off-gas from the fuel off-gas circulation path or a control device operatively connected to the discharge valve (see col. 6, line 30 to col. 7, line 30.) With regard to claims 3-4, Kobayashi et al. (JP2002-33110A) teaches that the control unit receives an output demand signal from the fuel cell output to give a target power generation amount. The control unit operates the gas-supply apparatus and the supply air to control the reactant flow to meet the needs of the system (see col. 7, lines 1-45; col. 9, line 40 to col. 10, line 55, claims 1-14.) The reference further teaches a voltage-measuring device (claims 6-7 and 11-12.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a discharge valve for controlling the direction of flow from the anode exhaust to either 1.) exhaust the spent fuel from the system or 2.) to recycle the flow of the fuel to through the recycle loop to the fuel source as taught in both Kashiwagi (US 2002/0136942) and Kobayashi et al. (JP2002-33110A) to further utilize unreacted hydrogen in the exhaust. In addition, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a voltage-measuring device in the fuel cell system to measure the cell voltage of the fuel cell in order to regulate the pressure of the supply gas as taught in Kobayashi et al. (JP2002-33110A) and supply the appropriate amount of fuel to the fuel cell electrode. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

With regard to claim 9, the Kashiwagi (US 2002/0136942) reference teaches that the fuel pump and recirculation flow paths are activated upon the start-up of the fuel cell (col. 3-4.) It would have been obvious to one of ordinary skill in the art at the time the invention was made to close a valve at the anode exhaust to flow air through the recirculation passage of the system. This will allow for more exhaust to flow in the direction of recirculation as taught in Kobayashi et al. (JP2002-33110A) allowing for a more efficient system. The art would have found the claimed invention to be obvious in light of the teachings of the references.

Response to Arguments

Applicant's arguments filed 6/8/2007 have been fully considered but they are not persuasive. Applicant argues that the Kashiwagi reference does not teach or suggest a discharge valve for discharging fuel off-gas from the fuel off-gas circulation path and a control device operatively connected to the discharge valve. Applicant further argues that the Kobayashi reference does not teach a control device operatively connected to the fuel pump and to the discharge valve for discharging the fuel off-gas from the fuel off-gas circulation path. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The rejection under 35 U.S.C. 103(a) states that the Kashiwagi reference does not teach a discharge valve for discharging fuel. The reference does suggest that a discharge valve is located in the recirculation passage at the point where spent fuel is exhausted from and/or recirculated through the fuel cell. Kobayashi

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teaches a control device operatively connected to a supply gas pump and to a discharge valve for discharging an off-gas from the off-gas circulation path. Kobayashi further teaches a voltage-measuring device. It would have been obvious to the skilled artisan, based on the teachings of both Kashiwagi and Kobayashi to use a controller to control the function of an exhaust valve for displacing gas from the fuel cell or recycling the exhaust, as noted in both references. Kashiwagi clearly teaches using a controller to control the exhaust valve of an oxidant supply gas. One of ordinary skill in the art would recognize that a controller may be used for the same purpose in the fuel side of the fuel cell to open and close a valve at the anode exhaust and flow unreacted exhaust through the recirculation passage of the system. This will allow the unreacted exhaust to flow in the recirculation direction as taught in both Kashiwagi and Kobayashi et al. to give a more efficient system.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Examiner Correspondence

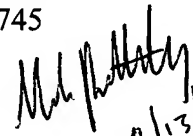
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free.)

Mark Ruthkosky

Primary Patent Examiner

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8/13/07